

## INEXPENSIVE CABLE PALLET STOP

5

### BACKGROUND OF THE INVENTION

#### Field of the Invention

10       The present invention relates to material-handling systems, and more particularly to inexpensive safety systems that prevent pallets from pushing in too far on their shelves.

#### Description of Related Art

15       Shelves and racks are a convenient way to store items, and can maximize floor space when palletized material is stored many levels high. A typical warehouse retail store, e.g., The Home Depot, has material racks that are two,  
20       three, and four levels high. Heavy items, like backup store inventory on a pallet, are placed and fetched from high above by a forklift. These heavy items can weigh anywhere from ten to two hundred pounds.

25       Heavy items placed 10-20 feet high above aisles in material racks and on shelves can present a significant and not-so-rare personal injury risk. Shaking, bumping, and poorly stacked items can come tumbling down and hurt people below, or at a minimum damage the product. In particular, when shelves are arranged back-to-back, pallets loaded from  
30       one side can push through and disturb pallets behind on the adjacent shelves.

      In jurisdictions like California, very rigid rules have been developed that require particular spacings and seismic tie-togethers of pallet shelving placed back-to-back. A six

inch flue space between back-to-back shelves is typical. Such flue space is important to maintain so fire sprinkler systems can get down to the lower levels of material on the shelves. But if nothing is in place to prevent it, material  
5 placed on one shelf can push out material on the shelf to the rear. The flue space can also be closed up or blocked by material or pallets protruding too far into this space.

Cost is a major concern in any commercial business and material handling setup. Struts or solid walls have  
10 conventionally been placed across the backs of shelves to prevent material pushing through, but the per-shelf cost of these solutions can be too high.

15 SUMMARY OF THE INVENTION

Briefly, a material shelving embodiment of the present invention comprises a basic shelving unit with vertical frame supports inter-tied with lateral load beams. At the  
20 rear of each shelf, between each pair of vertical frame supports, a backing cable is strung between two offset brackets just above the lateral load beams. Any pallets and material on pallets placed on the load beams of the shelving will be stopped from being pushed through by the backing  
25 cable.

An advantage of the present invention is that a shelving safety system is provided that prevents material from being pushed through the backside.

Another advantage of the present invention is that a  
30 safety cable is provided that is easy to install.

A further advantage of the present invention is that safety cable systems are provided that are inexpensive to install.

The above and still further objects, features, and advantages of the present invention will become apparent upon consideration of the following detailed description of specific embodiments thereof, especially when taken in  
5 conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

10

Fig. 1 is a perspective view of a safety netting system installed on a material rack shelving unit using offset brackets;

15 Fig. 2 is a perspective view of a pallet stop cable system embodiment of the present invention installed on a material rack shelving unit like that of Fig. 1 and using offset brackets like those detailed in Figs. 4A-4D and 5A-5F;

20 Fig. 3 is a plan view of several shelves arranged back-to-back and using the pallet stop cable system embodiment of the present invention like that of Fig. 2;

Figs. 4A-4D are, respectively, perspective, top, end, and side view diagrams of an offset bracket like that used in the systems of Figs. 1 and 2; and

25 Figs. 5A-5F represent an assembled offset bracket system in which an offset bracket is attached to a vertical pallet rack extension. In Fig. 5A, the offset bracket is attached at its minimum offset position, wherein the front part where the netting attaches is at the left. In Fig. 5B,  
30 the offset bracket is at a next offset position. In Fig. 5C, the offset bracket is attached at another more extreme offset position. In Fig. 5C, the offset bracket is at its most extreme offset position. In Fig. 5E, a perspective view diagrams the vertical pallet rack extension slipped

over a front frame part of a pallet rack and is secured with bolts. In Fig. 5F, the vertical pallet rack extension is shown being secured with an alternative arrangement of bolts to a plate bar.

5

#### DETAILED DESCRIPTION OF THE INVENTION

10

Fig. 1 illustrates a pallet-rack safety-netting system, referred to herein by the reference numeral 100. The pallet-rack safety-netting system 100 comprises a number of extension brackets 101-109 that are bolted to three  
15 respective pallet rack vertical frame sections 110-112. A set of suspension cables 114-125 are strung taut between the offset brackets 101-109 and support safety nets at their perimeters. For example, a safety net 126 is suspended away from the pallet rack framing by vertical cables 117 and 122,  
20 and horizontal cables 121 and 123; and a safety net 128 is suspended between vertical cables 120 and 124, and horizontal cables 123 and 125. The nets can be attached to the cables every few inches by nylon cable ties or metal snap-hooks.

25

Embodiments of the present invention permit the safety nets to be positioned at a variety of clearances from the face of the pallet rack framing. Such clearance is needed when the pallets loaded on the pallet rack have oversized material on them. The netting itself is provided to protect  
30 people in the aisleways from heavy material that might fall off the pallets in the racks. The offset brackets can be attached to either vertical frame sections of the pallet rack or to extensions of the vertical frame sections.

Fig. 2 illustrates a pallet stop cable system embodiment of the present invention, and is referred to herein by the general reference numeral 200. The system 200 is based on a shelving unit like that of Fig. 1. The pallet stop cable system 200 includes a set of vertical frame posts 201-206 between which are strung lateral loading beams 208-219. In Fig. 2, the lateral loading beams 208-219 are configured for three shelves each in two bays. In the front, as in Fig. 1, a safety netting is supported by front cable brackets 220-228, and netting cables 230-241.

Embodiments of the present invention have a set of rear cable brackets 242-250, that support rear-stop cables 252-257. These prevent pallets and material from being pushed out the rear of system 200. The rear cable brackets 242-250 and rear-stop cables 252-257 are strategically placed just above lateral support beams 209, 211, 213, 215, 217, and 219.

In Fig. 3, looking at the top plan view of six shelving system placed back-to-back, a group 300 includes shelving systems 301-306. Such are each similar to that of Fig. 2. A set of rear-stop cables 307-312 is shown respectively attached to the rears of each of shelving systems 301-306.

Figs. 4A-4D represent an offset bracket embodiment of the present invention, and is referred to herein by the general reference numeral 400. The offset bracket 400 can be used for offset brackets 101-109, Fig. 1. The preferred construction is generally in the form of a U-channel open at one end, as can be seen in Fig. 4B. The open end slips around the vertical frame sections 110-112, Fig. 1, and is just wide enough to accommodate the width of the frame section. For example, 3" inside. A pair of bolts is used to secure each bracket on the pallet rack at particular heights above the floor.

The offset bracket 400 comprises a first arm 402, a second arm 404, and an end-plate 408. A typical height is 2" and a typical length is 15-5/8". Such form a box-section at the closed end and is very rigid and stiff so that the bracket can well-support and anchor the set of suspension cables 114-125 strung taut between the offset brackets 101-109, Fig. 1. The box section is suggested in the drawings as being separate steel sheetmetal pieces that interlock with tabs. Alternatively, the section could be welded.

Two horizontal suspension cables can be accommodated by a pair of right-side holes 410 and 411 and their counterparts on the left side of bracket 400. One could anchor and run left to support a netting on the left, and the other cable could anchor at the bracket and run to the right.

In the bracket 400 illustrated in Figs. 4A-4D, there are four pairs of bolt holes 412-419 provided on the left and right arms for mounting the bracket to the vertical frame parts of a pallet rack. Only the ones on the right arm 404 are called out in Figs. 4A-4D. These bolts holes 412-419 are horizontally spaced to provide a range of offset adjustments, e.g., 3", 6", 9", and 12". Other spacings are possible and will be dictated by the applications.

Two vertical suspension cables can be accommodated by a pair of top-side holes 420 and 421 and their counterparts on the bottom side of bracket 400. One could anchor and run up to support a netting above, and the other cable could anchor at the bracket and run down toward the floor.

The pairs of holes 410 and 411 for the horizontal suspension cables are offset slightly differently from the pairs of holes 420 and 421 for the vertical suspension cables, e.g., so the cables do not interfere at their points of criss-cross inside the box end of bracket 400.

Figs. 5A-5F show an assembled offset bracket system 500 in which an offset bracket 502 is attached to a vertical pallet rack extension 504. In Fig. 5A, a pair of bolts 506 and 507 are used to attach the offset bracket 502 at its minimum offset position, e.g., 5" offset. The front part where the netting attaches is at the left. In Fig. 5B, bolts 506 and 507 attach the offset bracket 502 at a next offset position, e.g., 6" offset. In Fig. 5C, bolts 506 and 507 attach the offset bracket 502 at another more extreme offset position, e.g., 9" offset. In Fig. 5D, bolts 506 and 507 attach the offset bracket 502 at its most extreme offset position, e.g., 12" offset. In Fig. 5E, the vertical pallet rack extension 504 is shown slipping over a front frame part 508 of a pallet rack and is secured with bolts 510 and 511. In Fig. 5F, the vertical pallet rack extension 504 is shown being secured with an alternative arrangement of bolts 512 and 513 to a plate bar 514.

Although particular embodiments of the present invention have been described and illustrated, such is not intended to limit the invention. Modifications and changes will no doubt become apparent to those skilled in the art, and it is intended that the invention only be limited by the scope of the appended claims.

What is claimed is: